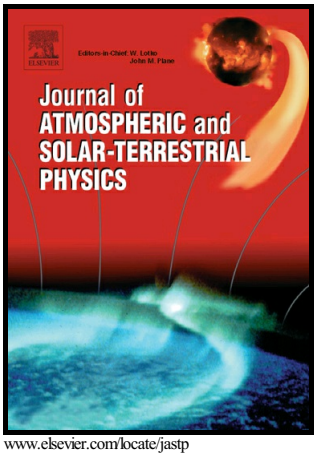

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PII: S1364-6826(17)30015-9
DOI: http://dx.doi.org/10.1016/j.jastp.2017.03.014
Reference: ATP4569

To appear in: *Journal of Atmospheric and Solar-Terrestrial Physics*

Received date: 12 January 2017
Revised date: 8 March 2017
Accepted date: 28 March 2017

Cite this article as: Joseph E. Borovsky, The Spatial Structure of the Oncoming Solar Wind at Earth and the Shortcomings of a Solar-Wind Monitor at L1 *Journal of Atmospheric and Solar-Terrestrial Physics* http://dx.doi.org/10.1016/j.jastp.2017.03.014

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The mesoscale (R_E to 100's of R_E) magnetic field structure of the solar wind as it approaches Earth is visualized in a Y-Z (GSE) plane upstream of the Earth. The visualization is created with a modified Voronoi diagram generated to represent some of the statistical properties of the solar wind: (1) the Parker-spiral average alignment of the solar-wind magnetic flux tubes, (2) the observed variation in the orientation of the individual flux tubes about the Parker-spiral direction, and (3) the observed variability of the diameters of individual flux tubes. The flux-tube structure, the magnetic-field vector structure, and the motional-electric-field structure of the oncoming solar wind is visualized and discussed. For instance, variations in the clock angle of the solar-wind magnetic field are associated with variations in the orientations of the passing magnetic flux tubes. Using this visualization, two-spacecraft transverse-to-radial correlations of solar-wind magnetic field are discussed, as is a case of two spacecraft on two sides of the Earth seeing an extended period of very different solar-wind properties. The solar-wind visualization is also used to discuss and quantify some shortcomings of using a single solar-wind monitor at L1 to determine the temporal properties of the solar wind that will hit the Earth: those shortcomings are (1) the aberration of the solar wind, (2) the directional variability of the solar-wind velocity vector, and (3) the orbit of the monitor about the L1 point.

Keywords: solar wind magnetosphere interaction, space weather, heliospheric structure, solar wind, Voronoi diagrams, growth model